

Elaphoglossum Moorei (E. G. Britton) Christ, Bull. Herb. Boiss.
 II. 3: 148. 1903.

Microstaphyla Bangii (Christ) Hieron. Bot. Jahrb. Engler, 34:
 539. 1904.

It is to be hoped that after this tedious experience the poor
 fern will rest in peace!

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COLUMBIA UNIVERSITY,
 20 April, 1905.

REVIEWS

Species and Varieties; Their Origin by Mutation*

To write two similarly comprehensive works upon the same subject, treated from the same point of view, and not displace the first by the second, nor make the second superfluous is a problem of no small magnitude. In presenting a second work on the mutation theory, Professor Hugo de Vries has solved this problem in a most admirable fashion.

"Species and Varieties: Their Origin by Mutation" is in no sense a rendering into English, of "Die Mutationstheorie," and is much more valuable in many respects than such translation could be made. The author was doubtless greatly aided in the successful solution of the problem by the difference of origin of the two works. "Die Mutationstheorie" is primarily a detailed exposition of the results of research, and was addressed to scientists who would appreciate — nay, demand — all the evidence on which are based the far-reaching generalizations involved in the theory of mutation. "Species and Varieties," on the other hand, having grown out of a series of lectures delivered by the author, before the students of a university, assumes in consequence a much less rigid scientific aspect, becoming by necessity intelligible to a wider circle of readers. A technical scientific work may be pored over by those immediately interested in its subject matter until all its important details are comprehended; but the successful lecturer must make himself instantly intelligible to his audience.

* De Vries, H. Species and Varieties: Their Origin by Mutation. Edited by D. T. MacDougal. 8vo, pp. xii + 847. Chicago: The Open Court Publishing Co. F 1905.

The unusual simplicity, directness and beauty of the language used, the purity of its Anglo-Saxon English, in connection with the largeness of its theme, renders the new book at once a classic, and although "Die Mutationstheorie" must always stand as the *epoch-making* work, it is "Species and Varieties" that will be found most frequently back to back with Darwin's "Origin of Species" on the shelves of the general libraries, and that will make the name of de Vries known as Darwin's is to every man and woman of intelligence regardless of vocation.

As compared with "Die Mutationstheorie," the new book shows many evidences that the author has profited by the discussions which have been aroused by that work, and he has very carefully defined his position in regard to points in which he has been misconstrued. Ardent Darwinians immediately attacked the new theory because it appeared to be offered as a substitute for the theory of "Natural Selection." In evident response to these attacks, the author has joined his views in a masterful way to those of Darwin, showing that there is no conflict, and making the reader feel that the theory of mutation was the next step logically, as it certainly has been the next important step historically in the development of a satisfactory conception of the origin of specific and varietal differences.

The basis of the author's views is the conception of character-units as the ultimate bearers of herëdity, a conception that, though seemingly too simple and inelastic to be entirely satisfying to the physiologist, has been brought into the greatest prominence and furnished support amounting at least to partial demonstration in the work of Mendel and of those who have since confirmed and extended Mendel's results, in the renaissance and extension of which Professor de Vries himself had such prominent part.

Recognizing as did Darwin that by far the greater part of our knowledge of evolutionary processes is necessarily based upon the results of economic practice, Professor de Vries has made a careful experimental analysis of horticultural and agricultural processes, and it is this part of his work which commends itself especially to the thinking scientist.

By showing that the years devoted by the horticulturist to "fixing" new garden varieties have for their purpose the elimination of the effects of "vicinism," *i. e.*, the chance crosses with neighboring species or varieties, and by distinguishing between ever-sporting varieties and those which possess only an ordinary degree of fluctuating variability, the way has been cleared for a proper appreciation of the true relations between the garden and nature. It is doubtful however whether physiologists will agree that the cases of "double adaptations" in nature, and the relation of juvenile to adult leaf-characters, are to be classed with the ever-sporting varieties of the garden, for in the former cases definite laws of occurrence of the alternative characters are discernible, while in the ever-sporting varieties no such laws have yet been detected and they seem in many instances to be closely related to fluctuating variations.

The book is divided into six sections. After an introductory lecture on the theories of evolution and methods of investigation, the conception of elementary species as distinct from systematic species is developed, and a definite and distinctive significance is attached to the term, "variety," which is quite different from its usually loose usage for any assemblage of forms less extensive than the systematic species. A variety as conceived by de Vries is not qualitatively like a species, being distinguished from the species to which it belongs and from which it has been derived in the possession or lack of some single definite character, or two or three single characters at most while species differ from one another in almost every character. The several different kinds of varieties, progressive, retrogressive, degressive, and ever-sporting, are thoroughly considered, along with the included subjects of latency and atavism.

The fifth section deals with mutations, the evening-primroses naturally having an important place, but the number of other fully authenticated cases described will doubtless give surprise to some readers who may have thought that the mutation theory rests only on the behavior of *Onagra Lamarckiana*.

The last section is devoted to individual and partial variability or "fluctuation" as it is called. This process, which has been

held by Wallace and the "Neo-Darwinians" as practically the only source of evolutionary changes, is held by Professor de Vries to have no effect whatever in giving rise to new specific and varietal distinctions, though it is of great importance both in nature and in culture, in that it allows a certain amount of adaptive change or amelioration within the species.

The editor professes to have changed as little as possible the original diction of the author, and for this the reader will be grateful both because it leaves unmodified the simple, genial flavor of the author's personality and because no material change is conceivable which would not have resulted in a more involved style. Some changes might have been introduced, however, which would have been distinct improvements, and it is to be hoped that in succeeding editions these changes will be made. Thus the description of the zygomorphic or bilateral flowers of *Digitalis* as "symmetrical" is using in an unusual though literally correct sense a word that has long been in use in descriptive botany with a totally different meaning. Another even less desirable practice of quite similar character is the interchangeable use of "retrogression" and "regression" for the mutative loss of a character. "Retrogression" was the term first applied by the author to this process and there is no reason why it should not be used exclusively in biological terminology in this very definite sense. "Regression" already has a distinctive significance in connection with "fluctuation" and is used in its proper sense in Section F. which is devoted to that subject. Much confusion will be avoided if in future editions "retrogression" be substituted for "regression" wherever the mutative loss of a character is intended. An added complication in this connection is found on page 221, where, presumably by a typographical error, "degressive evolution" is rendered "regressive evolution." A number of other typographical errors occur, but in most cases the context prevents misinterpretation. Aside from these the press-work leaves little to be desired.

The year 1904 will always be memorable in the annals of American science because of the number of distinguished foreign scientists who visited this country during that summer. Of these

none was received with more genuine appreciation and honor than Professor de Vries. No more fitting memorial of his summer in America could have been left to his delighted hosts than this series of charming lectures on the most fundamental problems of biology, and one may safely predict that the work will further stimulate the interest that has awakened everywhere in experimental research in variation and heredity, the two fundamental processes of organic evolution.

GEORGE HARRISON SHULL.

STATION FOR EXPERIMENTAL EVOLUTION,
COLD SPRING HARBOR, NEW YORK,
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PROCEEDINGS OF THE CLUB

WEDNESDAY, MARCH 29, 1905

This meeting was held at the New York Botanical Garden, Vice-President Underwood in the chair and twenty-three additional members present.

Mrs. L. Schöney, of New York, and Miss Caroline S. Romer, of Newark, were elected to membership. The scientific program consisted of "Remarks on Californian Conifers" by Le Roy Abrams.

The conifers of California have been of extreme interest to the botanical world from the time that that region was first explored. Nowhere do we find such unique trees as the sequoias, and nowhere is there such a profusion of genera and species. Nearly two thirds of the species of the United States, and all but two of the genera occur within the state. The distribution of these species, especially of some of the more local ones, is of considerable interest, and it was upon this subject that Mr. Abrams chiefly dwelt.

By far the greater number of species occur in the extreme northern part of the state. Here, within a radius scarcely exceeding one hundred miles no less than eleven genera and at least thirty species may be met with. This great profusion is